



"The Only Name in Liquid Fertilizer Equipment"

Owner/Operators Manual



Liquid Fertilizer Wagon- All Models

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INTRODUCTION

Congratulations on the ownership of this Liquid Fertilizer Application Cart. You should expect to have many years of trouble free operation with this piece of equipment. Any feedback from you in the operation of this equipment is greatly appreciated. This feedback helps us continue to make changes that meet the changing needs of our farm customers.

- Equipment should only be operated by an experienced, responsible operator
- A careful operator is the best insurance against an injury
- Never have anyone ride on the equipment when it is moving
- Stay clear of all moving parts when in operation

Use of this product for any other purpose than its original intent, abuse of the product and modification of the product is prohibited by Pattison Liquid Systems. Pattison Liquid Systems reserves the right to deny warranty claims due to situations that involve misuse, abuse, or modifications.

The original intent of this product does not include use where the maximum speed and pressure is exceeded. Ensure only fluids compatible with the components are used, and with no flammable characteristics.

If in doubt about the operation of this equipment, please give us a call at 1-866-509-0715.

WARRANTY

The obligation of Pattison Liquid Systems under this warranty is limited to the repair or replacement of defective parts or correction of improper workmanship of this equipment within one year from the date of purchase.

Where practical, the defective part must be sent to Pattison Liquid Systems. Replacement of the defective part or correction of improper workmanship will be at the discretion of Pattison Liquid systems after inspection of the part.

The warranty shall not apply to any piece of equipment that has been deemed to be misused, abused, or modified. Defective parts or expressed issues need to be dealt with immediately to ensure warranty.

INITIAL START-UP PROCEDURES

We strongly suggest that with the initial start-up, water is used to test the system.

- Using your fill pump, put approximately 200 gallons of clean water in each tank.
- Check for any leaks around tank and fill pump fittings.
- Open the valve at the bottom of the tank to allow water to fill the filter and suction hose.
- Set your pump setting to 10 on your ground drive pump and engage your pump drive assembly.
- Check that your drive assembly is fully engaged and all chains and sprockets are aligned.
- Remove your discharge hose from the top of the pump or disconnect distribution feed line at the hitch of the wagon.
- Drive ahead 100-200 meters to fully purge the pump system. Check for any leaks around pump inlet.
- This will allow the system to remove any foreign material that may be in the pump or plumbing.
- Shut off main tank valve and check strainer for any foreign material.
- Attach the discharge to the pump or re-connect hose for distribution kit.
- Engage diverter valve to allow water to travel out to the distribution kit.
- Make sure that your distribution kit has properly sized orifices for the application rate you require. A small sized orifice can produce very high pressures which can cause damage to the pump or plumbing. Too large an orifice will not create enough pressure to accurately apply fertilizer.
- Using the pump setting chart, set the pump for proper application rate (or visit www.CDS-johnBlue.com for pump flow calculator).
- Apply water initially over a known area (ex: 10 acres) to double check that application rates are correct.
- Check that all wheel bolts are tightened to the proper torque and air tire pressures are to manufacturer's specifications, as required.

MAINTENANCE

Daily:

1. Check oil levels in both ground drive and fill pump. SAE 90 gear oil in ground drive pump crankcase, and 10W-30 motor oil in fill pump motor.
2. Clean air filter on fill pump motor and remove dirt that collects on pump drive shaft between motor and pump.
3. Visual inspect chains and sprockets for wear and alignment. Lubricate chain as required.
4. Grease ball and socket assembly.
5. Inspect all plumbing for leaks. Pin holes in the suction hose and a loose strainer cap can cause pump to lose prime.

Seasonally (End of Season Storage):

1. Change gear oil in ground drive pump and motor oil in fill pump motor.
2. Repair or change any worn components on pump ground drive assembly. (Sprockets, bearings and chains are listed in the manual)
3. Check wheel bearings, hubs and axles. Tighten wheel bolts as required.
4. Grease zerks on drive shaft pillow blocks. Grease zerks on ground drive pump roller chain sprocket spacer, outboard cover plate, crankshaft end, stuffing box and ball & socket assembly.
5. Flush entire system with water. Remove filter bowl and clean tank of all foreign material.
6. Replace filter bowl and place 200 gallons of water in tank.
7. Drive ahead and flush entire system with water including the distribution kit.

8. Charge ground drive pump with a Propylene Glycol mix anti-freeze. This is achieved by removing the pump suction hose and using a smaller hose to draw antifreeze up through the intake ports by turning the pump.



Do not use RV antifreeze, as it will dry out seals and has no lubricating qualities.

9. Ensure all water has been removed from the distribution kit which can be done with air pressure. Many distribution kits contain check valves that trap water. With freezing conditions and water left in the kit, this will damage parts.
10. Any electronic devices, (rate controllers, flow meters) should be cleaned thoroughly and stored inside.

Pattison Liquid Systems provides a complete service and repair program for all CDS-John Blue piston pumps. It is suggested that maintenance on the pumps be performed every 15,000 acres, or as required. We offer a pump rebuild program in the off season, as preventative maintenance.

GROUND DRIVE PUMP

Your new wagon will come with standard equipment, the new generation ground drive piston pump manufactured by CDS John Blue. This pump delivers product from the tank to the distribution kit which is mounted on your seeding tool.

This pump is a positive displacement pump with the output controlled by a variable piston stroke. The pump is designed to accurately meter the delivery of liquid fertilizer. The pump, which is a chain driven device, operates in direct relationship to ground speed through the ground driven system. The application rate can be set by the pump setting procedures and will deliver the gallons per acre required regardless of the varying speed of the ground drive mechanism. Speed will affect pressures. The faster you travel, the higher the pressure.

This pump is designed to accurately deliver the gallon per acre required regardless of the downstream pressure. The distribution kit on your seeding tool is designed to accurately deliver a constant flow throughout the entire width of your seeding tool.



Installation:

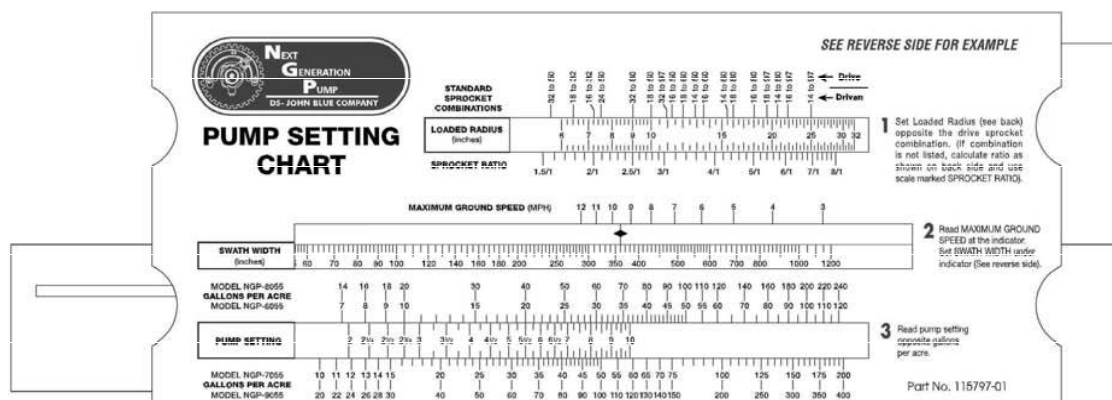
When the pump is installed, crankcase oil is checked for proper level and oil plug is replaced with a vented plug. SAE 90 gear oil is used in the crankcase. Oil level should be maintained at the oil plug which is at the same height as the crankshaft. Any minor seepage around the seal is caused by overfilling.

The pump is driven by a series of chains and sprockets from the large rear tire on the wagon. Ensure all chains are tight and aligned with the drive sprockets.

Your ground drive pump will be fed by a 1 1/2" suction hose. The suction hose also includes a 2" line filter with an 80 mesh strainer. Daily inspection of the filter is required to ensure flow from the tank is not obstructed. The discharge side of the pump includes a 1 1/2" hose feeding into the diverter valve.

Detailed information on your ground drive pump can be found in the accompanying pump manual.

GROUND DRIVE PUMP SETTING PROCEDURES



Your new wagon will have come with standard equipment, the new generation ground drive piston pump manufactured by CDS John Blue. A detailed operators manual for your pump will have accompanied your wagon operators manual. Detailed instructions on setting your pump are on pages 6 and 7 of your pump operators manual. In order to properly set your pump, you need to know the following information.

1. Sprocket Ratio
2. Loaded radius of drive wheel
3. Width of swath in inches – example 48' seeding tool – 576"
4. Application rate in US gallons per acre

To assist you in calculating what your pump setting would be to deliver the correct volumn per acre, we have installed a plate with information you require. This plate is positioned on the tank saddle frame above your pump. See picture below:



3 WAY DIRECTIONAL VALVE

Installation Instructions

Connect the Valve to the Liquid System:

When installing threaded connectors into the inlet and outlet of the valve, use a thread sealant compatible with the liquid that will be used in the system. Screw the connectors into the valve hand tight, then using a wrench, tighten the connectors an additional quarter to half turn. For valves with the manifold flange fittings, place the gasket between the two flanges. While holding the two flanges together, install the metal clamp. Tighten the clamp down firmly.

Connecting the Actuator to the Electrical System:

4 Wire: This type of actuator is generally used with a single pole, single throw (on off) switch. When the switch is turned to the On position, the valve will be open and when the switch is moved to the Off position, the valve will close. Red to Positive (+), Black to Negative (-), White or Green with Switch and tie Other to Red or Black, respectively.

3 Wire: This type of actuator is generally used with a single pole, single throw (on off) switch. When the switch is turned to the On position, the valve will be open and when the switch is moved to the Off position, the valve will close. Red to Positive (+), Black to Negative (-), White to Switch or Signal.

Troubleshooting

The first thing to try is to hook the electric valve directly to the battery. This is done by taking the valve out of the wiring being used. Connect the valve directly to a 12-volt battery. The valve can be tested by placing the green and black wire on the negative terminal and the red wire on the positive terminal. When the white wire is touched to the positive terminal of the battery, the valve should open. When the white wire is lifted off the positive terminal, the valve should close. If the valve performs as stated, the valve is functioning properly and the problem is in the system wiring. If the valve does not function correctly (and the battery is not dead) then the problem is in the motor assembly and the valve has a problem. In most cases the problem is in the wiring, not the motor. In cases where the valve does have a problem, there are four common problems as detailed in the following:

Motor does not run when switched. If when the switch is thrown, you cannot hear the motor running then the problem is either:

Upper limit switch broken: This was caused by the valve being hooked up incorrectly (the red wire being wired negative and the black wire being wired positive) causing the valve to rotate the wrong way. When the switch was thrown the first time, the ball rotated three quarters of a turn rather than a quarter turn, causing the backside of the cam to break the upper limit switch. If the limit switch is broken, you can shake the valve and hear parts rattling inside the housing. This cannot be fixed in the field. The cams have been modified so that if the ball rotates the wrong way, the valve still won't open & close correctly, but no damage will occur to the valve.

OR

Internal fuse tripped: The valve is calling for too much current, causing the poly fuse to trip. When this happens, the ball generally stops in a semi-open position. To reset the fuse, the red wire must be disconnected from the power source. The fuse trips when the valve has been over-tightened, or excessive abrasion or solids have made the valve so difficult to open and close that the motor draws too much current causing the fuse to trip. If the fuse keeps tripping, then the valve end plates need to be taken off to see what is causing the excessive current demand. Clean out any deposits and replace worn or damaged parts. Reassemble the valve and torque the bolts to 40 in-lbs (original factory setting). Repairs might require a little more torque to seal. If repairs are made, the current should be checked with an ohmmeter, with the maximum current spike of 3.5 amps. Again, this is a new valve and might vary after the valve has worn in.

Motor does run when switched. If when the switch is thrown, you can hear the motor running but the ball does not turn or does not open and close correctly, then the problem is either:

Bosses that hold motor in place have broken. The valve not opening and closing correctly indicates this. The screws holding the motor in place have broken the bosses and have allowed the motor to move inside the housing. You should be able to shake the valve back and forth and feel the motor moving inside the housing if this is the case.

OR

The shaft has been twisted off in the stem. When this happens, there is no movement of the ball while the motor is running. This is caused by excessive torque on the motor and cannot be repaired

Hubs and Spindles (Serial # 2011 & On)

Model	Front Axle	Rear Axle
CB2150	PP-HUB8000	PP-HUB16000
	Inner cup PPLM506810 cone PPLM506849	Inner cup PP47620 cone PP47687
	Outer cup PPLM501310 cone PPLM501349	Outer cup PP39520 cone PP39585
	Dust Cap – PP8000	Dust Cap – PPD16000 c/w gasket
	Grease seal – PPCR27631	Grease seal PPCR38730
	Wheel bolt – PP914271 Nut – PP914272	Wheel bolt – PP913472 Nut – PP912707
	SPINDLE - PPSPIN8000	Spherical washer – PP914314 SPINDLE – PPSPIN16000
CB3200	PP-HUB16000	PP-HUB16000
	Inner cup PP47620 cone PP47687	Inner cup PP47620 cone PP47687
	Outer cup PP39520 cone PP39585	Outer cup PP39520 cone PP39585
	Dust Cap – PPD16000 c/w gasket	Dust Cap – PPD16000 c/w gasket
	Grease seal PPCR38730	Grease seal PPCR38730
	Wheel bolt – PP913742 Nut – 912707	Wheel bolt – PP913742 Nut – 912707
	Spherical washer – PP914314 SPINDLE – PPSPIN16000	Spherical washer – PP914314 SPINDLE – PPSPIN16000
CB3200-D	PP-HUB16000	PP-HUB20000
	Inner cup PP47620 cone PP47687	Innercup-PPHM218210 cone-PPHM218248
	Outer cup PP39520 cone PP39585	Outercup-PPHM212010 cone-PPHM212049
	Dust Cap – PPD16000 c/w gasket	Dust Cap – PPD20000 c/w gasket
	Grease seal PPCR38730	Grease seal PPCR43771
	Wheel bolt – PP913742 Nut - 912702	Wheel bolt – PP913742 Nut - 912702
	Spherical washer – PP914314 SPINDLE – PPSPIN16000	Spherical washer – PP914314 SPINDLE – PPSPIN20000

Hubs and Spindles (Serial # 2011 & On)

Model	Front Axle	Rear Axle
CB4300	PP-HUB16000 Inner cup PP47620 cone PP47687 Outer cup PP39520 cone PP39585 Dust Cap – PPD16000 c/w gasket Grease seal PPCR38730 Wheel bolt – PP913742 Nut - 912702 Spherical washer – PP914314 SPINDLE – PPSPIN16000	PP-HUB20000 Innercup-PPHM218210 cone-PPHM218248 Outercup-PPHM212010 cone-PPHM212049 Dust Cap – PPD20000 c/w gasket Grease seal PPCR43771 Wheel bolt – PP913742 Nut - 912702 Spherical washer – PP914314 SPINDLE – PPSPIN20000
TB2150		PP-HUB16000 Inner cup PP47620 cone PP47687 Outer cup PP39520 cone PP39585 Dust Cap – PPD16000 c/w gasket Grease seal PPCR38730 Wheel bolt – PP913742 Nut – 912707 Spherical washer – PP914314 SPINDLE – PPSPIN16000
TB3200		PP-HUB20000 Innercup-PPHM218210 cone-PPHM218248 Outercup-PPHM212010 cone-PPHM212049 Dust Cap – PPD20000 c/w gasket Grease seal PPCR43771 Wheel bolt – PP913742 Nut - 912702 Spherical washer – PP914314 SPINDLE – PPSPIN20000

SPROCKETS, CHAINS AND JACKSHAFTS

Sprockets:

Model	Inside wheel drive	Jackshaft inside wheel	Jackshaft closest to pump
CB2150	PP60X54	PPD60B11F11/4	PP50X24
CB3200	PP80X45	PP80X09W	PP50X24
CB4300	PP80X45	PP80X09W	PP50X24
TB2150	PP60X54	PPD60B11F11/4	PP50X24
TB3200	PP80X45	PP80X09W	PP50X24

All Models – Pump sprocket – JB106532-01

Chains:

Model	Main wheel drive	Pump Drive
CB2150	PP60-2R	PP50-1R
CB3200	PP80-1R	PP50-1R
CB4300	PP80-1R	PP50-1R
TB2150	PP60-2R	PP50-1R
TB3200	PP80-1R	PP50-1R

JackShafts:

CB2150, CB3200, TB2150, TB3200 – 30" x 1.25"

CB4300 – 40" x 1.25"

All Models – Pillow Blocks – PPP206, Bearings – PPSA206-20G

Special order axle widths will vary.

MAGNETIC CLUTCH (Optional on Most Wagons)

To get the best performance and durability out of this heavy duty clutch, the following procedures need to be followed:

- Must use a minimum 12 gauge wire to power the unit
- All connections must be soldered or use proper weather proof connections. Limit the amount of connections used. Each additional wire connection will cause amperage/voltage drop, which can damage the clutch or cause it not to work properly.
- Proper cleaning and lubricating of the clutch will help prevent corrosion.
- Clutch can be wired into existing clutches, limit switches or power supplies, providing there is at least 12 volts DC and capability of handling 5-7 amps.

Failure to follow these procedures can result in clutch damage and void any warranty.

TROUBLE SHOOTING

Issue	Probable Cause
Pump hard to prime	Debris in filter or suction line Suction line or filter leaks Tank valve closed Pump set too low Drive chain slipping Pump valves needs repair
Pump creates low or no pressure	Debris in filter or suction line Suction line leaks Pump set to low Orifices in kit sized wrong Drive chain slipping Pump valves need repair Diverter valve not opening
Pump volume pulsating	Drive chain slipping Faulty pressure gauge
Pump building too much pressure	Orifices in kit sized wrong Debris in discharge line Plugged filter on kit Pump set to high Excessive speed
Incorrect application rate	Pump setting is wrong Diverter valve not operating properly Drive chain slipping Check tire pressure
Pump oil seal leaks	Pump over filled with oil Vented plug is not venting
Crankcase oil is milky in color	Fertilizer seeping into crankcase, pump needs rebuilding
Fertilizer dripping from weep holes between crankcase and gearbox	Pump needs rebuilding